North Carolina Department of Transportation
Planning and Research Branch
Thoroughfare Planning

Lenoir—Hudson Thoroughfare Plan

September, 1987

Lenoir - Hudson Thoroughfare Plan
1987 Update

Prepared by:

Thoroughfare Planning Unit
Planning and Research Branch
Division of Highways
North Carolina Department of Transportation

In cooperation with:

The City of Lenoir
The Town of Hudson

September, 1987

Persons responsible for the report:

Manager of Planning and Research:	C. D. Adkins, P. E.
Thoroughfare Planning Engineer:	L. R. Goode, PhD, P. E.
Project Engineers:	A. B. Norwood, P. E.
	G. R. Dudeck, P. E.
Engineering Technician:	Karen Roberson
Typist:	Word Processing

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

Introduction

Highway transportation system efficiency today more than ever plays a vital role in our economy and way of life. It is used every day by businesses, industry and the residential sector. It is the interface between all other modes of travel and is accepted as a necessary part of our suburban lifestyle. For this reason direct routing with minimum delay is an important consideration.

To ensure that an efficient system of streets is planned for, that individual projects fit into a master scheme and that a cohesive coordinated complementary system is achieved a thoroughfare plan is developed.

During the past thirteen years since the development of the original Lenoir-Hudson Thoroughfare Plan several new roads have been built. The Outer Loop, the most recent and most expensive of these projects is presently under consideration. To ensure that future construction is in line with recent growth trends, an updated thoroughfare plan as documented in this report was developed.

Existing and Projected Conditions

Lenoir and Hudson are located approximately seventy miles northwest of Charlotte and ninety miles northeast of Asheville in the foothills of the Blue Ridge Mountains as shown in Figure 1. Major highways serving the area include US 321, NC 18 and NC 90. Rail service is provided by the Carolina and Northwest Railroad which generally follows Norwood Street and runs north and south through the area.

The dominant industry for the area is furniture manufacturing which accounts for over 50% of the industry for the area. This trend is expected to continue with the expansion of production at existing locations.

Population growth for the Lenoir-Hudson planning area has been steady as shown in Table 1 and Figure 2. Figures in the 1980 Census show a growth in township and county population and a slight decrease in population inside the city limits of Lenoir. Extension of these trends to 2005 yields a planning area growth of 45% or approximately 15,000 people.

Residential growth has occurred mostly to the northeast and south of Lenoir and the east of Hudson.

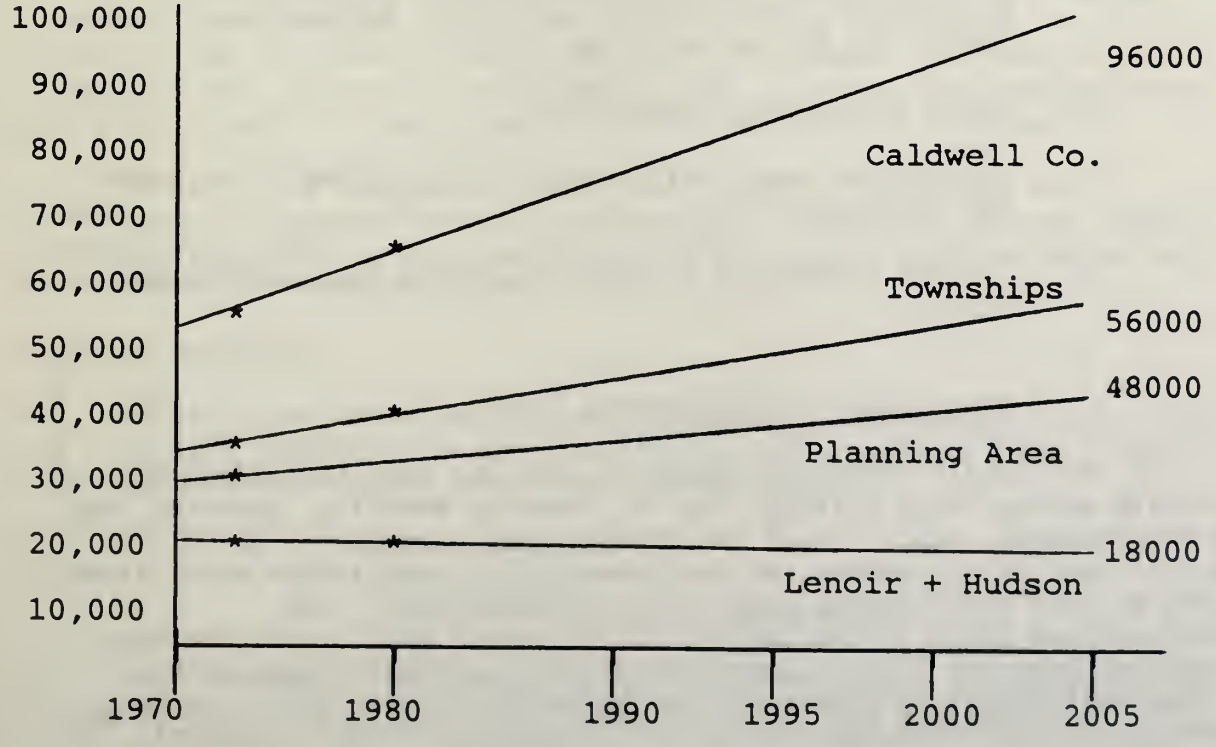
FIGURE 1
GEOGRAPHIC LOCATION
LENOIR AND HUDSON

LENOIR AND HUDSON ARE LOCATED IN THE MAJESTIC FOOTHILLS OF THE APPALACHIAN MOUNTAINS, 69 MILES NORTHWEST OF CHARLOTTE AND 73 MILES NORTHEAST OF ASHEVILLE.

Table 1 Population Projection for the Lenoir-Hudson Area					
Year	1970	1972	1980	1995	2005
Caldwell County	56,999	58,000	67,746	84,000	96,000
Lenoir, Hudson and Lower Creek Townships	35,639	37,000	40,837	50,000	56,000
Lenoir and Hudson	17,238	18,000	16,636	17,900	18,000
Planning Area	27,800	28,800	33,000	42,000	48,000

FIGURE 2

POPULATION TRENDS AND PROJECTIONS



No major shifts in existing development patters are anticipated.

Comprehensive long range transportation planning for the Lenoir-Hudson planning area began in 1971 with the development of a thoroughfare plan that was mutually adopted by Hudson on October 1, 1974, Lenoir on October 14, 1974 and the North Carolina Board of Transportation on November 1, 1974. General transportation system deficiencies that were identified in that study include the following:

1. The lack of an adequate loop system
2. Incomplete crosstown street system in the central business area
3. Many intersections were offset causing additional turning traffic on the major arterial streets
4. Some streets were not wide enough
5. Travel in many areas was indirect causing large volumes of traffic to share a few over congested intersections

More recent discussion has centered around the following general deficiencies:

1. The need for a loop system along Pleasant Hill Road
2. Providing a loop system between US 321, NC 90 and NC 18 North to prevent routing this traffic through the NC 18/US 321 intersection and giving direct access to all the US and NC routes in the area
3. Strip development along US 321
4. Interchange construction on US 321 Hibriten Drive and at the new outer loop
5. Traffic congestion on Connelly Spring Road and Norwood Street

Lenoir-Hudson Thoroughfare Plan

The 1974 Lenoir-Hudson Thoroughfare Plan was developed based on extensive survey data, state of the art computer modeling, expected land use developments, public input and professional judgement. Objectives of the plan were (1) to ensure the development of a coordinated major street system as land developments occur; (2) to reduce travel and transportation costs to the public; (3) to reduce public cost for major street improvements through coordination of the street system with private action; (4) to enable private interests to plan their actions, improvements and development with full knowledge of public interest; (5) to minimize disruption and displacement of people and business; (6) to

reduce transportation environmental impacts; and (7) to increase travel safety.

A basic concept of thoroughfare planning is that a functional system of streets be provided which permit travel from origins to destinations with directness, ease, and safety. Streets in the system are designed to minimize land use and travel conflicts. Local access streets which may be further classified as residential, commercial, or industrial streets are designed only to provide access to abutting property. Minor thoroughfares are more important streets in a city system and are designed to collect traffic from local access streets and carry it to the major thoroughfare system. They may also serve abutting property and serve some minor through traffic movements. The major thoroughfares are the primary traffic arteries of the city providing for traffic movements within, around, and through the area.

A coordinated system of major thoroughfares which is most adaptable to desire lines of travel within an urban area is the radial-loop system. The radial-loop system includes radials, crosstowns, loops, and bypasses. Radial thoroughfares provide for travel from points outside to major destinations inside the city. Crosstown thoroughfares provide for Bypasses across the central area and around the CBD. Loop thoroughfares provide for lateral travel movement between suburban areas. Bypasses are designed to carry non local traffic around or through the area. Bypasses can be designed to function as a portion of an urban loop. The radial-loop major thoroughfare system concept of functionally classified urban streets is illustrated in Figure 3.

The Lenoir-Hudson Thoroughfare Plan has served well for the past thirteen years and has led to the construction of the outer loop, NC 18 widening and the Vance Street connector. It appears that most of the basic concepts are still good, however due to growth and changing travel patterns a need for some alterations and expansion is necessary.

Existing and projected traffic as listed in Appendix A was considered in thoroughfare plan designation. Safety is also an important consideration and accident records for 1984 through 1986 inclusive were considered as discussed below.

Traffic Accidents

While system efficiency is very important, traffic safety must also be a serious consideration when developing a thoroughfare plan. Traffic accidents can be divided into three general types:

1. driver oriented
2. auto oriented
3. highway - environment oriented

Most accidents are predominantly driver oriented, although each of these sources usually make some contribution to the accident.

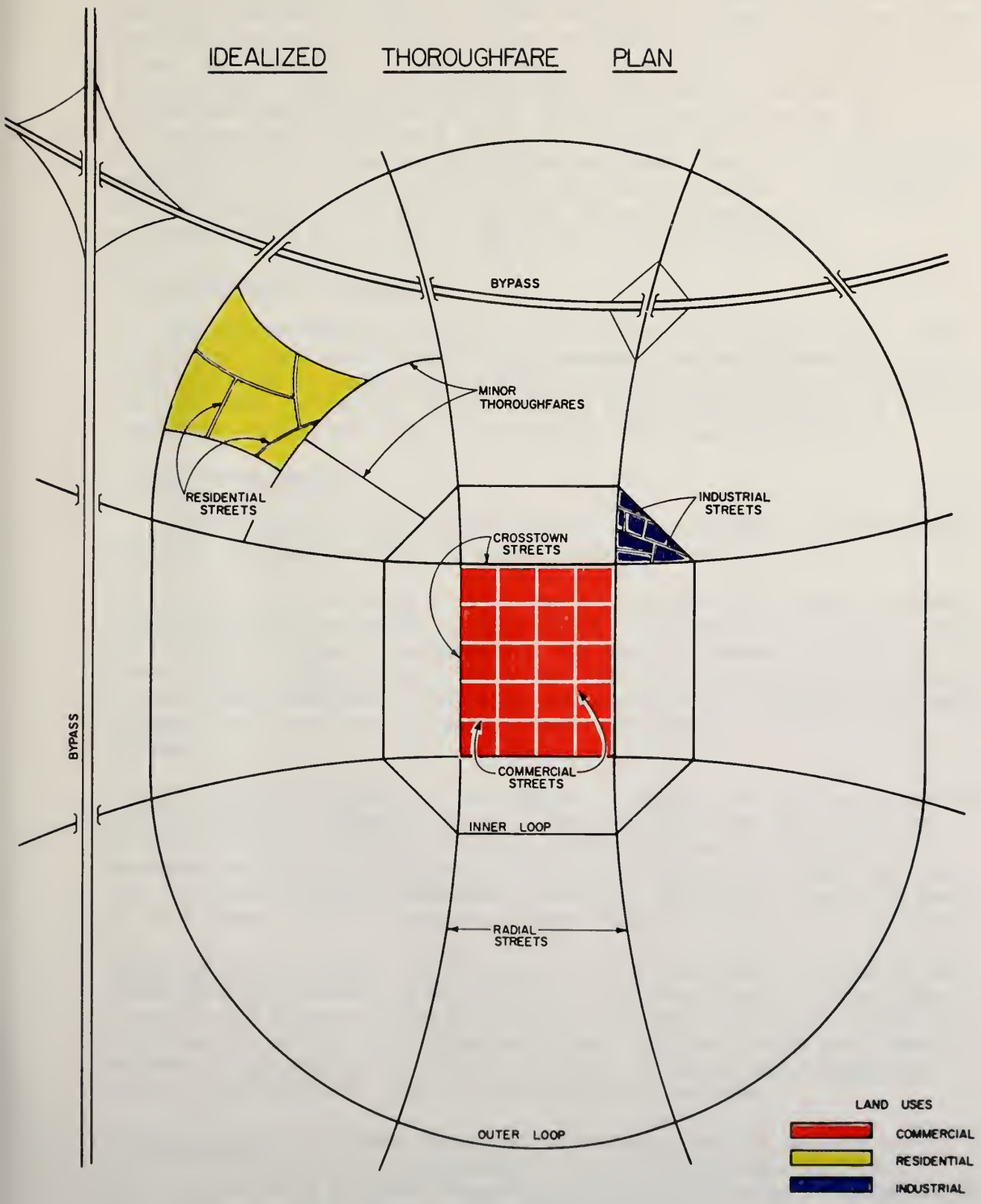
Accident records for 1984-1986 were studied as part of the update for the Lenoir-Hudson Thoroughfare Plan. A listing of locations with

Table 2

High Accident Locations

Street	Reference Point	Total Accidents	
		1970-1972	1984-1986
Harper Ave.	at Morganton Blvd.	49	58
Connelly Springs Rd.	at Norwood Street	24	40
Morganton St. (NC 18)	at Virginia Street	27	37
US 321	at NC 18	40	35
US 321	at SR 1108	Not Listed	34
Fairview Drive	at NC 18	28	30
Blowing Rock Blvd.	at Pennton Road	5	29
Blowing Rock Blvd.	at Hospital Ave.	16	24
Blowing Rock Blvd.	at Main St.	10	24
Harrisburg Dr.	at NC 18	18	23
Hickory Blvd.	at McClean Dr.	19	23
Taylorsville Road	at NC 18	14	23
Mulberry St.	at West Ave.	16	21
McClean Dr.	at Norwood St.	15	21
Blowing Rock Rd.	at ABC Court	5	21
NC 18	at Norwood St.	28	20

FIGURE 3


IDEALIZED THOROUGHFARE PLAN
BYPASS
MINOR THOROUGHFARES
RESIDENTIAL STREETS
INDUSTRIAL STREETS
CROSSTOWN STREETS
COMMERCIAL STREETS
INNER LOOP
RADIAL STREETS
OUTER LOOP
BYPASS
LAND USES
COMMERCIAL
RESIDENTIAL
INDUSTRIAL

twenty or more accidents is given in Table 2. A comparison of this list with the one done in the 1972 Thoroughfare Plan shows some significant changes. Boundary Street at Harper Avenue has dropped from twenty-two accidents to eight accidents during the study period and NC 18 at Main Street has dropped from twenty-nine accidents to six accidents for the same period. Harper Avenue at Morganton Boulevard, however is still the highest accident location and has increased from forty-nine to fifty-eight accidents for a three year period. Connlley Springs Road at Virginia Street is the second highest accident location and has increased more since 1972 than any other intersection evaluated. Improvements and/or changing travel patterns have caused a decrease in traffic accidents on US 321 at NC 18 and on NC 18 at Norwood Street.

Major Thoroughfare System

An evaluation of recent accident reports and updated traffic were considered along with general socio-economic and environmental considerations in establishing existing and proposed major thoroughfare designations. A further description of each major thoroughfare by functional classification is given below and shown in Figure 4.

Radial Thoroughfares

The following streets carry traffic away from the central business district and thus function as radial thoroughfares.

NC 18 - N.C. 18 serves as a major radial thoroughfare leading southwest to Morganton and northeast to Wilkesboro. It serves as a major connector to I-40 and provides transportation for some of Lenoirs work force from other areas. Traffic projections for 1995 for some parts of NC 18 have already been exceeded. A four lane cross section is therefore recommended between the Outer Loop (presently under construction) and SR 1143 (Gamewell).

Virginia Street - Access to the CBD, NC 18 Bypass and the new Outer Loop are provided via Virginia Street. Also located along this road are several of Lenoir's major furniture industries and the Carolina & Northwestern Railroad. Previous travel projections for 1995 for this facility have also been exceeded in several locations, however widening to four lanes is only necessary between Harper Avenue and NC 18 Bypass.

Connelly Springs Road - Radial service to the southern portion of the study area is provided by way of Connelly Springs Road. It provides connectivity between Pleasant Hill Road and the new Outer Loop and is proposed for extension to Hibriten Drive. This will also ease travel between US 321 and NC 18 Bypass. Traffic accidents and congestion support the immediate need for widening to five lanes.

Norwood Street - Norwood Street provides major service between Lenoir and Hudson and a variety of businesses. It carries the designation of US 321A and helps to ease congestion on US 321. Previous recommendations for widening to four lanes from Mulberry Street to

Optimist Avenue and widening to three lanes from Optimist Avenue to Cedar Valley Road should still be valid based on recent traffic trends. An extension to Mulberry Street is also recommended to continue Mulberry Street as a major thoroughfare.

McClean Drive - Connectivity between US 321 and Norwood Street is provided via McClean Drive. Previous 1995 traffic estimates forecast an average daily volume of 5200 vehicles for this road. Recent counts indicate 8400 vehicles use this road daily. Therefore it is recommended that McClean Road be widened to four lanes by 2005.

US 321 - Major radial service north and south of Lenoir is provided by US 321. Between NC 18 and Main Street US 321 serves as a bypass and will be discussed in the "Bypass" section for this reason. Previous traffic estimates for this facility seem to be in line with recent trends which indicate a need for widening to a divided four lane cross section from NC 18 to SR 1352. New interchanges are also proposed at Hibriten Drive and at the new Outer Loop. Due to the high traffic volumes on US 321 efforts should be made to minimize strip development and its associated lack of access control.

Zacks Fork Road - Travel from expanding residential areas northeast of Lenoir will be encouraged by the maintenance of Zacks Fork Road as a major thoroughfare. Traffic counts in this area have tripled since

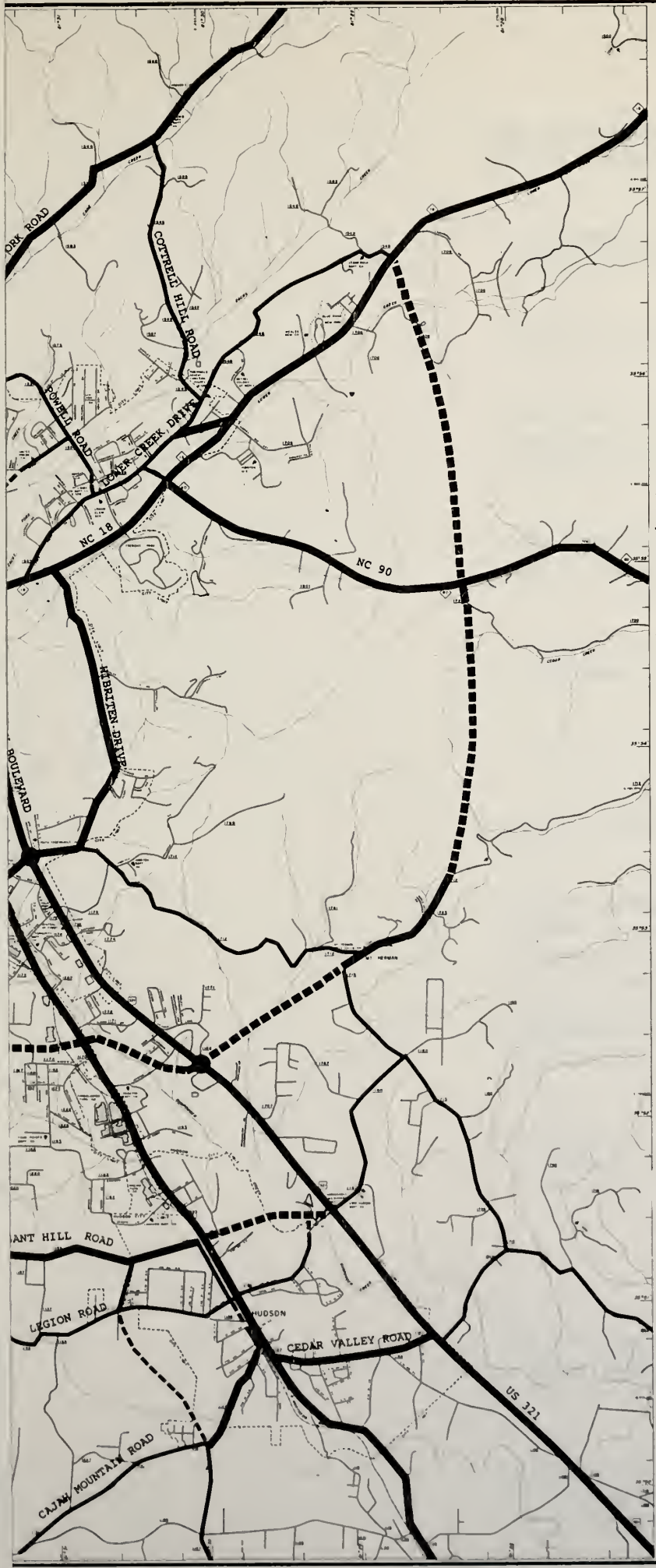


FIGURE 4
LENOIR-HUDSON
THOROUGHFARE PLAN

June 1987

Adopted By City Of Lenoir

Adopted By Town Of Hudson

Recommended Approval By Planning And Research Branch

Adopted By North Carolina Department Of Transportation

LEGEND

	EXISTING	PROPOSED
MAJOR	▬▬▬	▬ ▬ ▬
MINOR	———	- - - -

PROPOSED INTERCHANGE ●

NORTH CAROLINA STATE D O T
PLANNING AND RESEARCH DEPARTMENT

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

Optimist Avenue and widening to three lanes from Optimist Avenue to Cedar Valley Road should still be valid based on recent traffic trends. An extension to Mulberry Street is also recommended to continue Mulberry Street as a major thoroughfare.

McClean Drive - Connectivity between US 321 and Norwood Street is provided via McClean Drive. Previous 1995 traffic estimates forecast an average daily volume of 5200 vehicles for this road. Recent counts indicate 8400 vehicles use this road daily. Therefore it is recommended that McClean Road be widened to four lanes by 2005.

US 321 - Major radial service north and south of Lenoir is provided by US 321. Between NC 18 and Main Street US 321 serves as a bypass and will be discussed in the "Bypass" section for this reason. Previous traffic estimates for this facility seem to be in line with recent trends which indicate a need for widening to a divided four lane cross section from NC 18 to SR 1352. New interchanges are also proposed at Hibriten Drive and at the new Outer Loop. Due to the high traffic volumes on US 321 efforts should be made to minimize strip development and its associated lack of access control.

Zacks Fork Road - Travel from expanding residential areas northeast of Lenoir will be encouraged by the maintenance of Zacks Fork Road as a major thoroughfare. Traffic counts in this area have tripled since

FIGURE 4

LENOIR-HUDSON

THOROUGHFARE PLAN

June 1987

Adopted By City Of Lenoir

Adopted By Town Of Hudson

Recommended Approval By Planning And Research Branch

Adopted By North Carolina Department Of Transportation

LEGEND

	EXISTING	PROPOSED
MAJOR	———	- - - -
MINOR	———	- - - -

PROPOSED INTERCHANGE ●

NORTH CAROLINA STATE D O T
PLANNING AND RESEARCH DEPARTMENT
U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

1972, but are still within the capacity of a two lane road. Projections for 2005 will exceed those made for 1995, however no major widening is recommended.

NC 90 - N.C. 90 is the only major road leading northwest out of Lenoir and east to Statesville. Traffic counts are in line with previous projections and no major widening is recommended.

SR 1352 - This road connects US 321 and NC 90 north of Lenoir. No major improvements are recommended.

Main Street - Main Street gives radial access from Lenoir north to NC 90 and US 321. It also carries the NC 90 designation and functions as a crosstown facility from Scroggs Street south. Widening to three lanes is recommended from Scroggs Street to US 321.

Abington Road (SR 1310) - Areas west of Lenoir are served by Abington Road. Traffic growth on this road has been moderate and no major widening is needed.

Finely Avenue - Finely Avenue with an extension to US 321 will serve new development on US 321 and provide access to the northeast CBD Bypass System.

Bypass System

Two major facilities form the bypass system for Lenoir as listed below.

NC 18 Bypass (Morganton Boulevard) - East-west travel through the study area is carried by the NC 18 Bypass. Previous travel projections have already been exceeded in some locations and development has increased significantly, however, due to the high design of this facility no major improvements are needed. The intersection at Harper Avenue should however be studies to try to decrease the high incidence of accidents at this location. Conditions should be reevaluated after the Southern Loop opens to traffic.

US 321 - A bypass function is served by US 321 between NC 18 and Main Street. This allows north-south traffic to flow through the area without mixing with local traffic in downtown Lenoir. Widening to a four lane divided cross section is recommended.

Loop System

Creekway Drive - Northwest circumferential travel will be carried by way of Creekway Drive which will act as part of the Outer Loop. Updated traffic counts indicate that the existing cross section will be adequate until 2005.

NC 18 Business - Circumferential traffic from Creekway Drive will connect with the new southern loop via NC 18 Business. NC 18 Business from Creekway Drive to the new southern loop will need to be widened to four lanes. This improvement is already underway.

Southern loop - Construction of a new loop facility from NC 18 Business to US 321 is presently under construction as a four lane divided road with an interchange at US 321. This will relieve congestion on NC 18 Bypass, US 321 and Norwood Street, making travel more direct and safe.

US 321 - NC 90 Connector - The US 321 - NC 90 Connector acts as an extension to the Southern Loop and makes travel between NC 90 and US 321 more direct. This facility would also help congestion on NC 18 and US 321, particularly where they intersect. Initially traffic would justify only construction of two lanes, however right of way should be purchased for an ultimate four lanes.

Lakewood Road - A three lane connector between Norwood Street and US 321 along Lakewood Road is proposed to relieve the NC 18 - US 321 intersection and make travel more direct.

NC 90 - NC 18 Connector - Construction of this connector would be long range and subject to future feasibility studies. It would serve as a logical continuation of the outer loop and would be a two lane road.

Hibriten Drive - Travel between NC 18, US 321 and the Southern Loop will be carried by Hibriten Drive, with minimum delays at US 321 due to the proposed interchange for this location. No widening is recommended.

Abington Road - NC 18 Connector - Travel between Abington Road and NC 18 will use this connector to go south on NC 18. A two lane road will be adequate for this purpose.

Pleasant-Hill-Road - A number of secondary roads connect US 321 with NC 18 in the Pleasant Hill Road area. The drive presently encounters a series of offset intersections, curves and a gravel road. The proposal would correct these conditions and result in a standard two lane facility.

Cedar Valley Road (SR 1127) - Accessibility to US 321 is provided via Cedar Valley Road. Traffic volumes do not justify widening.

Cajah Mountain Road - Cajah Mountain Road serves travel in the area immediately west of Hudson. No major improvements are recommended.

Crosstown System

The following streets carry traffic around and through the Lenoir downtown area:

Mulberry Street - A one-way operation with Main Street will work well on Mulberry Street out to the proposed Main Street Connector. From that point to Norwood Street two-way operation is recommended. No widening is proposed.

Main Street - A three lane connector to Mulberry Street is proposed so that Main Street can function as a one way street without widening up to Scroggs Street. Between Scroggs Street and US 321 Main Street will function as a radial facility.

Ridge Street - Ridge Street will operate one way north bound from Harper Avenue to West Street. Between West Street and Scroggs Street two way operation will remain. No widening is proposed.

Scroggs Street - A connection between Ridge Street and Vance Street can be accomplished with the Scroggs Street Extension. A two lane urban cross section is recommended.

Vance Street - Wheeler - Street - Willow - Street - These streets will serve a crosstown function for the west side of the Lenoir downtown area.

West Avenue - Harper Avenue - One way operation of these streets will continue to function well. Harper Avenue will resume two way operation east of Ridge Street as it presently does.

Harper Avenue - College Avenue - One way operation is proposed for Harper and College Avenue with new two lane connectors proposed at Creekway Drive and near West Avenue. Loading docks along College Avenue need to be built to minimize their impact on traffic flow.

Minor Thoroughfares

Minor thoroughfares are more land service oriented than major thoroughfares. Their primary function is to collect traffic from residential street and distribute it to the major thoroughfare system. Roads that should be listed as minor thoroughfares are listed below:

Cottrell Hill Road

Lower Creek Drive (SR 1565, 1548 & 1549)

Powel Road (SR 1531)

Taylorsville Road

Hospital Avenue - Pennell Street - A connector will be required to remove the offset intersection at Seehorn Place

Greenhaven Drive - Stonewall Street (SR 1523)

Finley Avenue (between Vance Street and Main Street)

Ridge Street (North of Scroggs Connector)

Norwood Street (Harper Avenue to Mulberry Street)

Pennton Avenue (Spruce Street to Harper Avenue)

Covington Street - Spruce Street - Spruce Street Extension

Harrisburg-Drive - Delwood Drive

Broadway Street - Hoods Creek Road (SR 1301)

Jennings Street - Underdown Avenue

Dula Town Road (SR 1148 & 1149)

Clarks Chapel Road (SR 1153)

Finley Avenue (Vance Street to Main Street)

Walt Arney Road (SR 1167)

Legion Road - Huss Avenue - 1st & 2nd Street N.E.

8th Street N.W. - 8th Street Extension and SR 1127

Cajah Mountain Road (SR 1131)

NC 90 - Hoods Creek Road Connector

SR 1160

SR 1715

SR 1809

Central Street - Central Street Extension

College Avenue (Underdown Avenue to Norwood Street)

Wheeler Road

Mount Herman Road

Construction Priorities

Projects recommended in the 1987 Thoroughfare Plan can be categorized by priority as listed below. Costs were updated and the net benefit per mile was calculated as another characteristic for comparison. The net benefits are derived by subtracting the cost from the twenty year benefits. Benefits include accident costs, driving time and vehicle costs. As shown in Table 3 and Figure 5, the Lakewood Road Connector stands out as a beneficial project to implement. Norwood Street widening, Connelly Springs Road improvements and Harper Avenue widening are approximately equal in benefits and should also be given high priority consideration. Other projects that have a low net benefits per mile rating should be reevaluated at regular intervals and should improve as traffic volumes increase.

Table 3

PRIORITIES AND PROJECT BENEFIT ANALYSIS

PRIORITY	PROJECT	BENEFITS ($)	COSTS ($)	LENGTH (MILES)	NET BENEFIT MILE*	Economic Development Probability	Environmental Impact Probability
1.	LAKEWOOD ROAD CONNECTOR	23,700,000	700,000	0.3	$76,660,000	0.1	-.70
2.	NORWOOD STREET WIDENING	288,900,000	8,000,000	5.1	55,078,000	0.6	+.60
3.	CONNELLY SPRING ROAD	261,700,000	5,800,000	4.7	54,446,000	0.8	+.70
4.	HARPER AVENUE WIDENING	129,800,000	1,400,000	2.4	53,500,000	0.8	+.60
5.	SCROGGS STREET CONNECTOR	4,150,000	200,000	0.1	38,500,000	0.4	-.20
6.	MULBERRY STREET CONNECTOR	6,600,000	800,000	0.2	29,000,000	0.5	-.20
7.	NC 18 WIDENING (SR 1312 to SR 1143)	58,500,000	2,100,000	2.3	24,500,000	0.9	+.70
8.	CENTRAL STREET EXTENSION	4,500,000	200,000	0.2	21,650,000	0.1	+.20
9.	ABINGTON ROAD-NC 18 CONNECTOR	17,230,000	1,400,000	1.5	10,553,000	0.5	-.40
10.	NC 90 - NC 18 CONNECTOR	22,700,000	2,000,000	2.1	9,900,000	0.2	-.70
11.	FINELY AVENUE EXTENSION	6,600,000	700,000	0.6	9,800,000	0.8	+.50
12.	US 321 - NC 90 CONNECTOR	38,350,000	3,800,000	3.9	8,859,000	0.2	-.70
13.	SPRUCE STREET EXTENSION	11,040,000	2,400,000	1.2	7,200,000	0.3	-.30
14.	8TH STREET EXTENSION	8,540,000	930,000	1.1	6,918,000	0.4	-.20
15.	MAIN STREET CONNECTOR	600,000	100,000	0.1	5,000,000	0.2	+.50
16.	PLEASANT HILL ROAD (EXTENSIONS AND IMPROVEMENTS)	18,400,000	3,200,000	6.6	2,303,000	0.1	+.70
17.	NC 90 - HOODS CREEK ROAD CONNECTOR	8,100,000	2,300,000	2.7	2,200,000	0.2	-.30

*Net Benefits = 20 Year Benefits - Costs

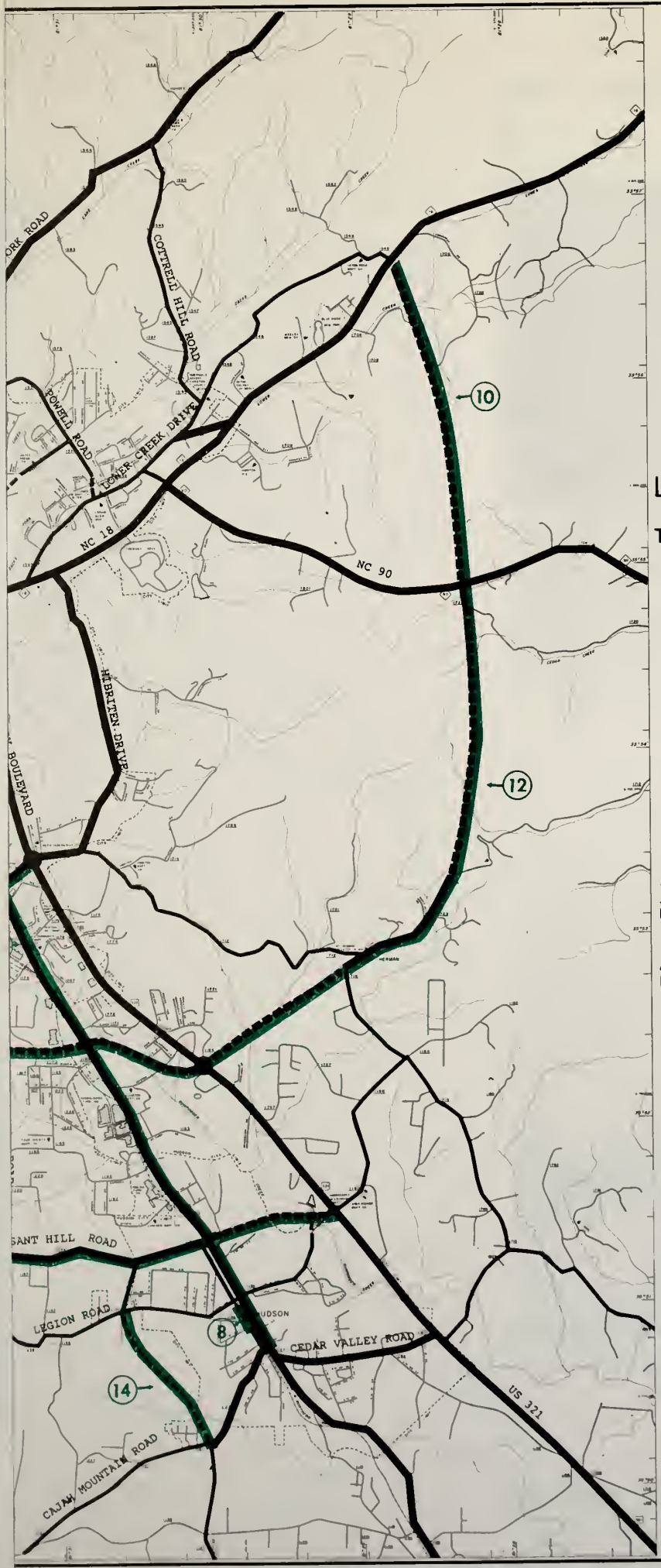


FIGURE 5

LENOIR - HUDSON

THOROUGHFARE PLAN CONSTRUCTION PRIORITIES

June 1987

Adopted By City Of Lenoir

Adopted By Town Of Hudson

Recommended Approval By Planning And Research Branch

Adopted By North Carolina Department Of Transportation

LEGEND

	EXISTING	PROPOSED
MAJOR	▬▬▬	▬ ▬ ▬
MINOR	———	- - - -

PROPOSED INTERCHANGE ●

NORTH CAROLINA STATE D O T
PLANNING AND RESEARCH DEPARTMENT

U S DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

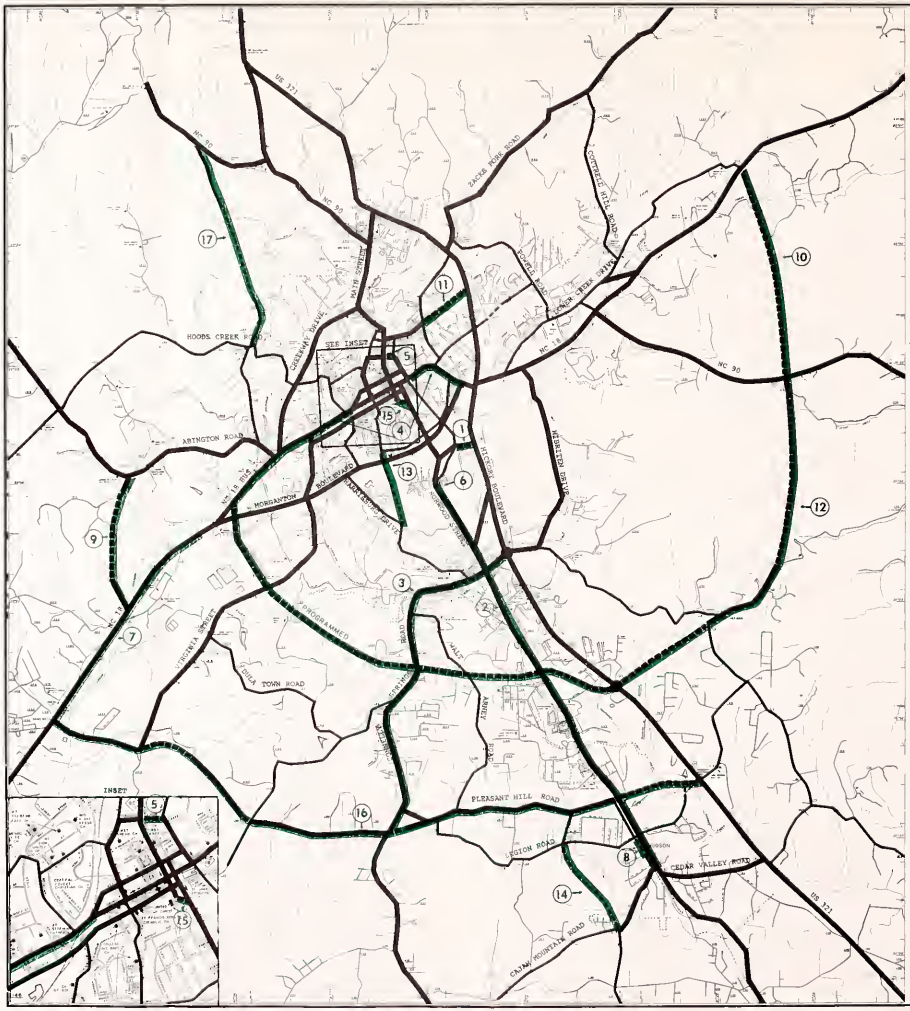


FIGURE 5

LENOIR - HUDSON

THOROUGHFARE PLAN CONSTRUCTION PRIORITIES

June 1987

Adopted By City Of Lenoir

Adopted By Town Of Hudson

Recommended Approval By Planning And Research Branch

Adopted By North Carolina Department Of Transportation

LEGEND

	EXISTING	PROPOSED
MAJOR		
MINOR		

PROPOSED INTERCHANGE

NORTH CAROLINA STATE DOT
PLANNING AND RESEARCH DEPARTMENT
U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

PHOTO LOG OF SELECTED NEEDS

LAKEWOOD CONNECTOR

NORWOOD ST. NORTH OF CONNELLY SPRINGS

CONNELLY SPRINGS NEAR NORWOOD

HARPER AVE. LOOKING EAST

SCROGGS ST. LOOKING EAST

CENTRAL ST. EXT.

8TH ST. EXT. NEAR HUDSON

SOUTH MAIN ST.

PLEASANT HILL NEAR SR 1153

PLEASANT HILL NEAR CONNELLY SPRINGS

OUTER LOOP

COLLEGE AVE. NEAR BEALL ST.

Implementation

There are several tools which are available for implementation of the thoroughfare plan. They are as follows:

State and Municipal Adoption of the Thoroughfare Plan

Chapter 136, Article 3A, Section 136-66.2 of the General Statutes of North Carolina provides that after development of a thoroughfare plan, the plan may be adopted by the governing body of the municipality and the Board of Transportation as the basis for future street and highway improvements. After mutual adoption, negotiations will begin to determine which of the existing and proposed thoroughfares will be a Board of Transportation responsibility and which will be a municipal responsibility. Facilities which are designated a State responsibility will be constructed and maintained by the Division of Highways; however, the municipality will share in the right-of-way costs with the municipality's share of the cost to be determined at time of construction.

Chapter 136, Article 3A, Section 136-66.1 of the General Statutes provides guidance in the delineation of responsibilities. In summary, these statutes provide that the Department of Transportation shall be responsible for those facilities which serve volumes of through traffic and traffic from outside the area to major business, industrial, governmental and institutional destination located inside the municipality. The municipality is responsible for those facilities which serve primarily internal travel.

The existing Lenoir-Hudson Thoroughfare Plan was adopted by Lenoir and Hudson in 1974. Agreement on street and highway system responsibilities was approved in 1976 and should be updated following thoroughfare plan adoption.

Subdivision Control

A subdivision ordinance requires that every subdivider submit to the City Planning Commission a plot of his proposed subdivision. Certain standards must be met by the developer before he can be issued a building permit to construct his development. Through this process, it is possible to reserve or protect the necessary rights of way for projected streets which are a part of the thoroughfare plan and to require street construction in accordance with the plan.

Facilities which could be implemented or partially implemented by subdivision control include:

1. Hospital Avenue Extension
2. Spruce Street Extension
3. 8th Street Extensions
4. Parts of the US 321 - NC 90 Connector
5. Abington Road - NC 18 Connector
6. NC 90 - Hoods Creek Road Connector

Official Street Map

A municipality may, through special enabling legislation, adopt an official street map which indicates both existing and future street lines. No new construction or reconstruction of structures would be permitted within the designated future street lines. This would, over a period of time, reduce the cost of additional right of way along densely developed thoroughfares which will require widening at some future date.

Future street lines should be established to provide for the ultimate right of way specified in Appendix C.

Zoning

A zoning ordinance can be beneficial to thoroughfare planning in that planned locations of various land uses and planned densities of dwellings can be realized. This provides a degree of stability on which to make future traffic projections and to plan streets and highways.

Other benefits of a good zoning ordinance are: (1) the establishment of standards of development which will aid traffic operations on major thoroughfares, and (2) the minimization of strip commercial development which creates traffic friction and increases the traffic accident potential.

The zoning ordinance should be structured to control strip development along the major traffic-carrying thoroughfares. There are several major streets on the existing system that have experienced a decreased traffic-carrying capacity due to strip development. Necessary efforts should be maintained to retard strip development and thereby protect the traffic-carrying capability of US 321, Norwood Street and NC 18.

Urban Renewal

Urban renewal is the term used to describe the removal of slums and allows for corrections to basic problems in the street system layout and design.

To qualify for community development funds or discretionary funds, a city must first prepare a community development program. Urban areas compete throughout the state on the bases of demographic points which consider such conditions as percent of substandard housing, people per square foot of housing, dwelling age etc.

An effort should be made to ensure that community development and transportation plans are compatible.

Capital Improvements Program

One of the tools which makes it easier to build a planned thoroughfare system is a capital improvements program. This is a long range plan for the spending of money on street improvements, acquisition of right-of-way, and other capital improvements within the bounds of projected revenues. Municipal funds should be available for construction of street improvements which are a municipal responsibility, right of way cost sharing on facilities designated a Division of Highways responsibility, and advance purchase of right of way where such action is required.

The section of the capital improvements program which deals with the thoroughfare plan requires a fairly detailed knowledge of the costs of various projects. Therefore, the cost estimates included in this report should be used with caution since they are preliminary estimates based on general statewide averages of construction costs and "windshield" estimates of right of way costs.

APPENDICES

APPENDIX A

LENOIR - HUDSON
THOROUGHFARE PLAN STREET TABULATION AND RECOMMENDATIONS

FACILITY & SECTION	EXISTING X - SECTION DIST MI	RDWY FT	ROW FT	CAPACITY CURRENT (FUTURE)	1986 ADTS	2005 ADTS	RECOMMENDED X - SECTION RDWAY (ULT)	ROW (ULT)
ABINGTON ROAD								
HARPER - SR 1301	2.70	19	60	6500	5000	9000	ADEQ	ADEQ
CONNECTOR TO NC18	1.50	-	-	-	-	4000	L	100
BROADWAY STREET - HOODS CREEK ROAD								
HARPER - CREEKWAY	0.70	27	30	9000	2000	3000	ADEQ	ADEQ
CREEKWAY - SR 1307	1.50	22	20	6000	700	1500	ADEQ	ADEQ
CAJAH MOUNTAIN ROAD								
US 321A - ELM	0.10	24	25	8700	3000	9000	ADEQ	ADEQ
ELM - SR 1127	0.60	18	60	5700	3000	9000	ADEQ	ADEQ
SR 1127 - SR 1130	1.20	18	60	5700	2000	4500	ADEQ	ADEQ
CEDAR VALLEY RD.(SR 1127)								
US 321 - US 321A	1.20	20	30	6300	5000	7000	ADEQ	ADEQ
CENTRAL STREET(HUDSON)								
CAJAH MTN. - LEGION	0.20	20	30	6000	3000	6000	ADEQ	ADEQ
LEGION - HUSS	0.20	-	-	-	-	-	I	60
HUSS - PLEASANT HILL	0.30	18	30	6000	500	4000	ADEQ	ADEQ
CLARKS CHAPEL RD.(SR 1153)								
SR 1001 - SR 1146	2.10	18	20	5800	1400	3000	ADEQ	ADEQ
COLLEGE AVENUE		35-	40-					
NORWOOD - BOUNDARY	0.30	54	50	9000	5500	6500	ADEQ	ADEQ
BOUNDARY - VIRGINIA	0.80	21	50	5200	4500	5500	ADEQ	ADEQ
CONNELLY SPRINGS ROAD (SR 1001)								
US 321 TO NORWOOD RD.	0.30	24	60	8700	9800	17000	D	80
NORWOOD RD. - RAILROAD	0.40	-	-	-	-	15000	D	80
RAILROAD- SR 1146	4.00	24	60	8700	10000	17000	D	80
SR1146 - SR 1130	1.80	24	60	8700	7500	12000	ADEQ	
COVINGTON STREET								
SEE SPRUCE STREET								
COTTRELL HILL RD.(SR1545)	1.8	18	60	6000	500	1500	J	70
DULA TOWN RD. (SR1148 & 1149)	1.9	16	60	3000	1600	3000	J	70
CREEKWAY DRIVE								
SEE OUTER LOOP								
DELWOOD DRIVE								
SR 1001 - HARRISBURG	0.90	18	20	5700	2000	3000	ADEQ	ADEQ
FINLEY AVENUE								
VANCE- STONEWALL	0.60	20	30	4000	3500	2000	ADEQ	ADEQ
STONEWALL-US321	0.60	-	-	-	-	3000	J	70

FACILITY & SECTION	EXISTING X-SECTION DIST MI	RDWY FT	ROW FT	CAPACITY (FUTURE)	1986 ADTS	2005 ADTS	RECOMMENDED X-SECTION RDWAY (ULT)	ROW (ULT)
GREENHAVEN DRIVE - STONEWALL STREET								
US 321 - FINLEY	0.80	20	30	5000	3200	2700	ADEQ	ADEQ
FINLEY - HOSPITAL	0.40	19	100	4500	1300	2500	ADEQ	ADEQ
HARPER AVENUE								
US 321-MORGANTON BLVD	0.10	72	72	30000	18500	26000	ADEQ	ADEQ
MORGANTON - NORWOOD	0.60	36	45	13000	13000	18000	D	80
NORWOOD - WEST	0.60	36	55	13000	9000	14000	ADEQ	ADEQ
WEST - VIRGINIA	0.50	30	40	11000	8000	13500	H	60
VIRGINIA - NC 18	1.30	25	40	7000	8100	15000	H	60
HARRISBURG DRIVE								
NC 18 - NORWOOD	1.40	24	20	5000	3000	4000	ADEQ	ADEQ
HIBRITEN LANE								
NORWOOD - NC 18	2.50	20	20	6500	2500	5000	ADEQ	ADEQ
HOODS CREEK ROAD								
SEE BROADWAY STREET								
HOSPITAL AVE - PENNELL ST								
HARPER - US 321	0.60	25	30	5000	4000	5000	ADEQ	ADEQ
US 321 - SEEHORN	0.10	36	40	9000	2000	4100	ADEQ	ADEQ
NEW CONNECTOR	0.20	-	-	-	-	4000	L	60
CONNECTOR - POWELL	0.40	18	30	5700	2000	4000	ADEQ	ADEQ
HUSS AVENUE								
NORWOOD-PLEASANT HILL	0.20	16	20	3000	1000	3000	L	40
INNER LOOP								
EAST-FOREST(RIDGE ST)	0.20	24	30	5000	2000	5000	ADEQ	ADEQ
CONNECTOR TO SCROGGS	0.10	-	-	-	-	4000	I	60
MAIN-VANCE (SCROGGS)	0.10	25	30	5000	700	3700	ADEQ	40
SCROGGS - COLLEGE (WILLOW STREET)	0.50	16	*30	5000	2000	4000	K	50
JENNINGS ST-UNDERDOWN AVE		16-	30-					
NC 18 - COLLEGE	0.60	28	50	3000	3500	2500	ADEQ	ADEQ
LAKEWOOD ROAD								
NORWOOD - US 321	0.30	24	20	-	-	6500	I	80
LEGION ROAD								
US 321A - SR 1159	2.30	18	30	6000	1300	6000	ADEQ	ADEQ
LOWER CREEK DR-WILDWOOD RD								
NC 18 - SR 1549	3.00	22	60	7100	4000	7000	ADEQ	ADEQ
MAIN STREET		41-	40-					
COLLEGE - SCROGGS	0.40	50	50	15000	6000	10000	ADEQ	ADEQ
SCROGGS - US 321	1.60	*22	40	7000	5000	9000	I	60
CONNECTOR TO MULBERRY	0.10	-	-	-	6000	9000	I	60

FACILITY & SECTION	EXISTING X - SECTION DIST MI	RDWY FT	ROW FT	CAPACITY CURRENT (FUTURE)	1986 ADTS	2005 ADTS	RECOMMENDED X - SECTION RDWAY (ULT)	ROW (ULT)
MCLEAN DRIVE								
US 321 - US 321 A	0.70	21	40	6500	8400	7400	ADEQ	ADEQ
MOUNT HERMAN ROAD								
HIBRITEN-MT HERMAN	2.20	18	60	6000	900	2000	L	100
MORGANTON BOULEVARD								
SEE NC 18								
MULBERRY STREET								
WEST - NC 18	0.70	32	40	10000	5500	9000	ADEQ	ADEQ
NC 18 - BRITISH WOODS	0.20	27	25	8000	7000	14000	D	80
BRITISH WOODS DRIVE	0.20	25	60	8000	2000	10000	D	80
NEW CONNECT TO NORWOOD	0.20	-	-	-	-	10000	D	120
NC 18 BUSINESS (SEE HARPER AVE								ADEQ
NC 18								
SR 1143 - SR 1312	2.30	24	150	8700	10700	15000	B	200
SR 1312 - HARPER	3.10	62	60	25000	13000	17000	ADEQ	ADEQ
US 321 - LOWER CREEK	0.30	62	117	25000	16000	20000	ADEQ	ADEQ
LOWER CREEK - NC 90	1.10	24	150	8700	12000	18000	ADEQ	ADEQ
NC 90 - SR 1549	2.00	24	105	8700	8000	11000	ADEQ	ADEQ
NC 90 (EAST)								
NC 18 - SR 1720	2.00	24	60	8700	4800	7600	ADEQ	ADEQ
NC90-HOODS CREEK RD. CONN								
SR 1341	0.60	16	60	5000	800	3000	L	100
SR 1341-SR1303	1.00	-	-	-	-	3000	L	100
SR 1303	0.50	18	60	6000	500	3000	L	100
NC 90 (WEST)								
SEE VALWAY ROAD								
NORWOOD STREET (US 321A)								
WEST - COLLEGE	0.30	26	50	6600	2200	4000	ADEQ	ADEQ
COLLEGE - NC 18	0.70	19	50	4000	1000	4700	ADEQ	ADEQ
NC 18 - MULBERRY	0.30	21	60	5700	4800	3000	ADEQ	ADEQ
MULBERRY - MCLEAN	1.20	23	60	8500	9200	8000	D	80
MCLEAN - SR 1001	0.10	33	60	10000	17000	15000	D	80
SR 1001 - OPTIMIST	3.10	22	60	8000	12000	17000	D	80
OPTIMIST-CEDAR VALLEY	0.70	33	60	14000	9000	15000	D	ADEQ
CEDAR VALLEY - SR 1108	1.40	20	60	7000	7000	12000	ADEQ	ADEQ
OUTER LOOP								
MAIN - HARPER	1.80	22	100	8000	6300	9000	ADEQ	ADEQ
HARPER - NC 18	0.50	-	-	-	-	20000	B	200
NC 18 - VIRGINIA	0.70	-	-	-	-	21000	B	200
VIRGINIA - US 321	2.70	-	-	-	-	19000	B	200
US321- SR1715	1.10	-	-	-	-	5000	L	200
SR1715 TO NEW CONN.	0.90	20	60	8000	2500	5000	ADQ	200
SR 1712 TO NC 90	1.90	-	-	-		5000	L	200
NC 90 -NC 18	2.10	-	-	-	2000	4000	L	

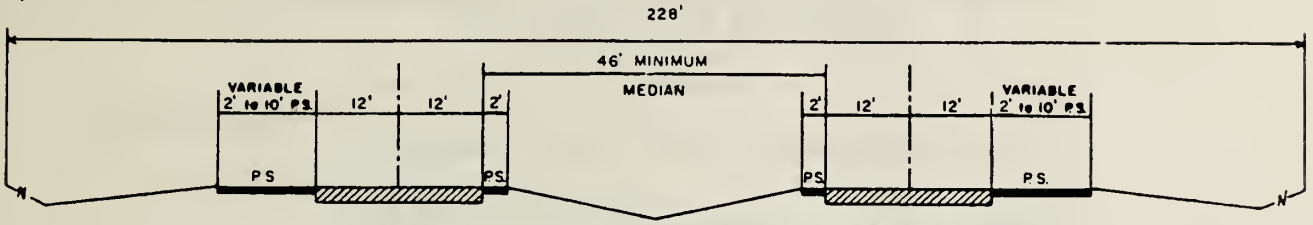
FACILITY & SECTION	EXISTING X - SECTION DIST MI	RDWY FT	ROW FT	CAPACITY CURRENT (FUTURE)	1986 ADTS	2005 ADTS	RECOMMENDED X - SECTION RDWAY (ULT)	ROW (ULT)
PENNELL STREET								
SEE HOSPITAL AVENUE								
PENNTON AVENUE								
SPRUCE - HARPER	1.10	23	40	4000	3000	4000	ADEQ	ADEQ
PLEASANT HILL ROAD (SR 1159)								
US 321 - US 321A	0.90	-	-	-	-	7000	L	60
US 321A - SR 1001	2.10	18	60	5700	3400	6400	REALIG	60
SR 1001 TO NC 18	3.6	18	60	5700	2800	6000	REALIG	60
POWELL ROAD								
ZACKS FORK - PENNELL	1.00	22	30	2000	500	1000	ADEQ	ADEQ
PENNELL - LOWER CREEK	0.40	19	60	6000	1500	2000	ADEQ	ADEQ
RIDGE STREET								
SEE INNER LOOP								
SCROGGS STREET								
SEE INNER LOOP								
SOUTHERN LOOP (SEE OUTER LOOP)								
SR 1127	0.6	22	60	8000	2000	3000	ADQ	ADQ
SR 1160	1.1	20	60	-	1400	3000	ADQ	ADQ
SR 1715	2.0	18	60	-	2500	4000	ADQ	ADEQ
SR 1809	0.8	20	60	-	2500	4000	ADQ	ADEQ
SPRUCE ST & EXTENSION - COVINGTON STREET								
COLLEGE - LENOIR AVE	0.20	16	30	3000	700	2000	J	70
LENOIR AVE - PENNTON	0.40	23	40	5000	500	2000	J	70
PENNTON - HARRISBURG RD.	1.50	-	-				J	100
TAYLORSVILLE ROAD	0.20	16	40	3000	500	1000	ADQ	ADEQ
US 321								
SOUTH PLAN'G B'DRY - NC 18	1.80	4L	200	35000	18000	35000	ADEQ	ADEQ
NC 18 - HOSPITAL AVE	4.50	24	100	9000	22000	37000	ADEQ	ADEQ
HOSPITAL TO SR 1352	3.90	24	100	9000	12000	23000	ADEQ	ADEQ
VALWAY ROAD (NC 90 WEST)								
MAIN - SR 1341	2.80	18	20	4500	3500	4500	ADEQ	ADEQ
VANCE STREET(SEE INNER LP)								
SCROGGS TO N. MAIN	0.3	30	60	15000	2000	4000	ADEQ	ADEQ

FACILITY & SECTION	EXISTING X - SECTION DIST MI	RDWY FT	ROW FT	CAPACITY CURRENT (FUTURE)	1986 ADTS	2005 ADTS	RECOMMENDED X - SECTION RDWAY (ULT)	ROW (ULT)
VIRGINIA STREET								
HARPER - NC 18	0.70	20	60	5300	6100	9000	ADEQ	ADEQ
NC 18 - OUTER LOOP	0.80	20	60	6000	4000	6000	ADEQ	ADEQ
OUTER LOOP - SR 1145	2.50	18	30	6000	2100	5000	ADEQ	ADEQ
WALT ARNEY ROAD								
OUTER LOOP - SR 1220	1.20	16	20	4000	2400	6000	L	60
NEW CONNECTOR TO PLEASANT HILL	0.80	-	-	-	-	6000	L	60
SR 1220-PLEASANT HILL	0.60	16	20	4000	2400	6000	L	60
WEST AVENUE								
RIDGE - WILLOW	0.40	42	70	15000	5200	9000	ADEQ	ADEQ
WILLOW - HARPER	0.30	26	50	8000	5200	8000	ADEQ	ADEQ
WILLOW STREET								
WEST - COLLEGE	0.20	23	30	7000	1000	3000	ADEQ	ADEQ
ZACKS FORK ROAD								
US 321 - SR 1545	2.60	18	20	5700	3000	7000	ADEQ	ADEQ
8TH ST. N.W.	0.30	18	40	3000	-	-	ADQ	ADQ
8TH ST. EXTENSION	1.10	-	-	-	-	2000	L	60

TYPICAL THOROUGHFARE CROSS SECTIONS

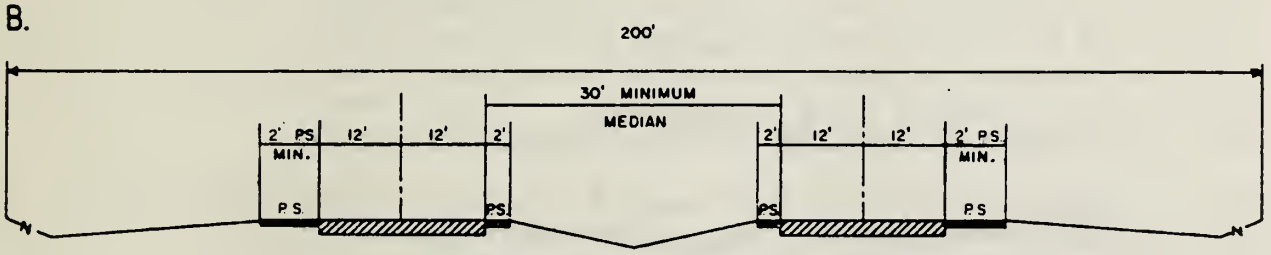
FIGURE A-1

A.



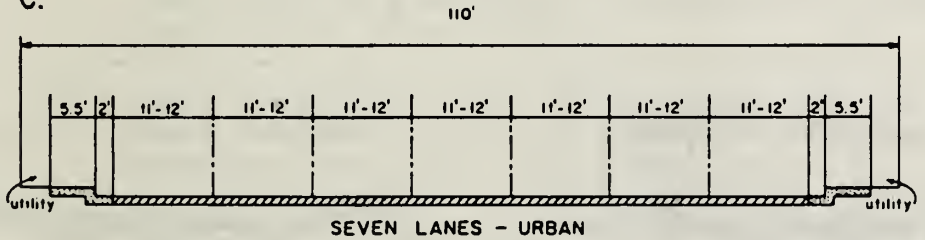
FOUR LANES DIVIDED WITH MEDIAN - FREEWAY

B.



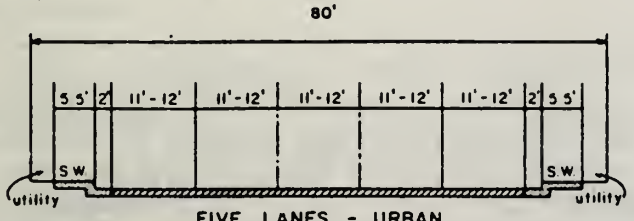
FOUR LANES DIVIDED WITH MEDIAN - RURAL

C.



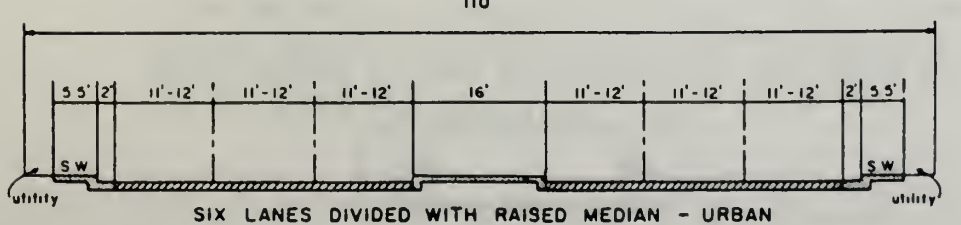
SEVEN LANES - URBAN

D.



FIVE LANES - URBAN

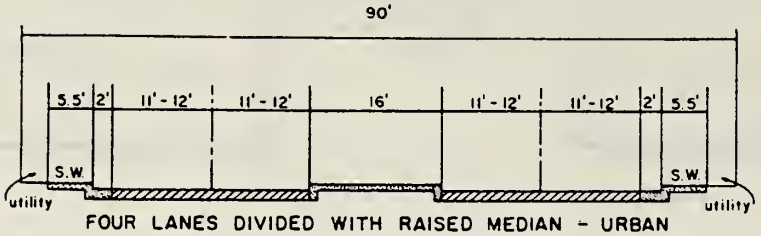
E.



SIX LANES DIVIDED WITH RAISED MEDIAN - URBAN

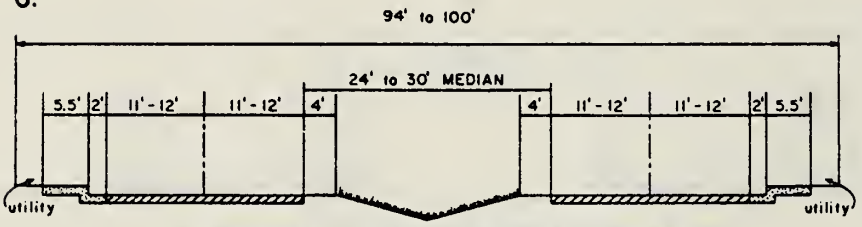
TYPICAL THOROUGHFARE CROSS SECTIONS
(CONTINUED)

F.



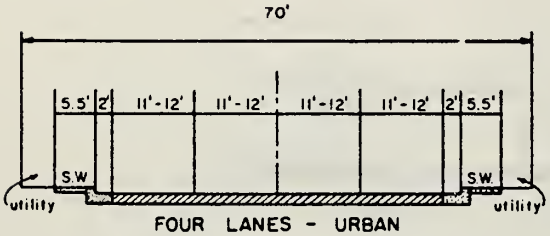
FOUR LANES DIVIDED WITH RAISED MEDIAN - URBAN

G.



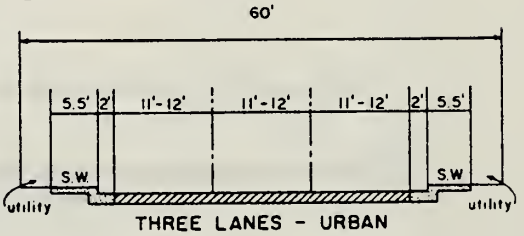
FOUR LANES DIVIDED - URBAN BOULEVARD
GRASS MEDIAN

H.



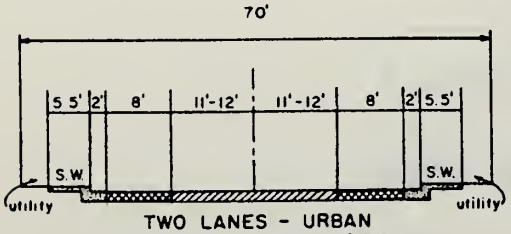
FOUR LANES - URBAN

I.



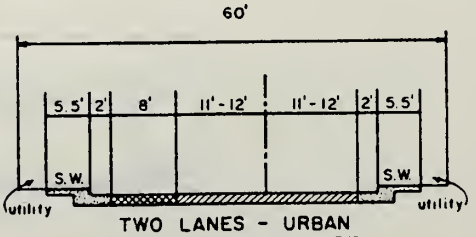
THREE LANES - URBAN

J.



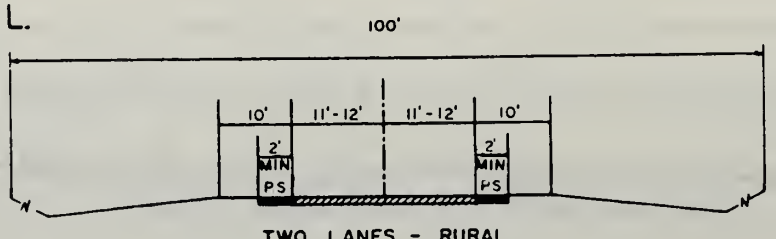
TWO LANES - URBAN
PARKING ON EACH SIDE

K.



TWO LANES - URBAN
PARKING ON ONE SIDE

L.



TWO LANES - RURAL

APPENDIX B

RECOMMENDED DEFINITIONS AND DESIGN STANDARDS FOR SUBDIVISION ORDINANCES

DEFINITIONS:

I. Streets and Roads:

A. Rural Roads

1. Principal Arterial - A rural link in a network of continuous routes serving corridor movements having trip length and travel density characteristics indicative of substantial statewide or interstate travel and existing solely to serve traffic. This network would consist of Interstate routes and other routes designated as principal arterials.

2. Minor Arterial - A rural link in a network joining cities and larger towns and providing intrastate and intercounty service at relatively high overall travel speeds with minimum interference to through movement.

3. Major Collector - A road which serves major intracounty travel corridors and traffic generators and provides access to the Arterial system.

4. Minor Collector - A road which provides service to small local communities and links the locally important traffic generators with their rural hinterland.

5. Local Road - A local road that serves primarily to provide access to adjacent land and for travel over relatively short distances.

B. Urban Streets

1. Major Thoroughfares - Major thoroughfares consist of Interstate, other freeway, expressway, or parkway links, and major streets that provide for the expeditious movement of high volumes of traffic within and through urban areas.

2. Minor Thoroughfares - Minor thoroughfares are important streets in the city. system and perform the function of collecting traffic from local access streets and carrying it to the major thoroughfare system. Minor thoroughfares may be used to supplement the major thoroughfare system by facilitating a minor through-traffic movement and may also serve abutting property.

3. Local Street - A local street is any link not on a higher-order urban system and serves primarily to provide direct access to abutting land and access to higher systems.

C. Specific Type Rural or Urban Streets

1. Freeway, expressway, or parkway' - Divided multilane roadways designed to carry large volumes of traffic at relatively high speeds. A freeway is a divided highway providing for continuous flow of vehicles with no direct access to abutting property or streets and with access to selected crossroads provided via connecting ramps. An expressway is a divided highway with full or partial control of access and generally with grade separations at major intersections. A parkway is a highway for non-commercial traffic, with full or partial control of access, and usually located within a park or a ribbon of parklike development.

2. Residential Collector Street - A local access street which serves as a connector street between local residential streets and the thoroughfare system. Residential collector streets typically collect traffic from 100 to 400 dwelling units.

3. Local Residential Street - Cul-de-sacs, loop streets less than 2,500 feet in length, or streets less than one mile in length that do not connect thoroughfares, or serve major traffic generators, and do not collect traffic from more than 100 dwelling units.

4. Cul-de-sac - A short street having but one end open to traffic and the other end being permanently terminated and a vehicular turnaround provided.

5. Frontage Road - A local street or road that is parallel to a full or partial access controlled facility and functions to provide access to adjacent land.

6. Alley - A strip of land, owned publicly or privately, set aside primarily for vehicular service access to the back side of properties otherwise abutting on a street.

II. Property

A. Building Setback Line - A line parallel to the street in front of which no structure shall be erected.

B. Easement - A grant by the property owner for use by the public, a corporation, or person(s), of a strip of land for a specific purpose.

C. Lot - A portion of a subdivision, or any other parcel of land, intended as a unit for transfer of ownership or for development or both. The word "lot" includes the words "plat" and "parcel".

1. Corner Lot - A lot abutting upon two streets at their intersection.

2. Double-Frontage Lot - A continuous (through) lot which is accessible from both of the parallel streets upon which it fronts.

3. Reverse-Frontage Lot - A continuous (through) lot which is accessible from only one of the parallel streets upon which it fronts.

III. Subdivision

A. Subdivider - Any person, firm, corporation or official agent thereof, who subdivides or develops any land deemed to be a subdivision.

B. Subdivision - All divisions of a tract or parcel of land into two or more lots, building sites, or other divisions for the purpose, whether immediate or future, of sale or building development, and all divisions of land involving the dedication of a new street or a change in existing streets; provided, however, that the following shall not be included within this definition nor subject to these regulations: (1) the combination or recombination of portions of previously platted lots where the total number of lots is not increased and the resultant lots are equal to or exceed the standards contained herein; (2) the division of land into parcels greater than ten acres where no street right-of-way dedication is involved, (3) the public acquisition by purchase of strips of land for the widening or opening of streets; (4) the division of a tract in single ownership whose entire area is no greater than two acres into not more than three lots, where no street right-of-way dedication is involved and where the resultant lots are equal to or exceed the standards contained herein.

C. Dedication - A gift, by the owner, of his property to another party without any consideration being given for the transfer. Since a transfer of property is involved, the dedication is made by written instrument and is completed with an acceptance.

D. Reservation - A reservation of land does not involve any transfer of property rights. It simply constitutes an obligation to keep property free from development for a stated period of time.

Design Standards

I. Streets and Roads:

The design of all streets and roads within _____ shall be in accordance with the accepted policies of the North Carolina Department of Transportation, Division of Highways, as taken or modified from the American Association of State Highway Officials' (AASHO) manuals.

The provision of street rights-of-way shall conform and meet the requirements of the thoroughfare plan for _____ as adopted by the _____ and the North Carolina Department of Transportation.

The proposed street layout shall be coordinated with the existing street system of the surrounding area. Normally the proposed streets should be the extension of existing streets if possible.

The urban planning area shall consist of that area within the urban planning boundary as depicted on the mutually adopted _____ Thoroughfare Plan. The rural planning area shall be that area outside the urban planning boundary.

A. Right-of-Way Widths: Right-of-way widths shall not be less than the following and shall apply except in those cases where right-of-way requirements have been specifically set out in the Thoroughfare Plan.

	Min. Right of Way, Ft.
1. Rural	
a. Principal Arterial	
Freeways	350
Other	200
b. Minor Arterial	100
c. Major Collector	100
d. Minor Collector	100
e. Local Road	*60

*The desirable minimum right-of-way is 60 feet. If curb and gutter is provided, 50 feet of right-of-way is adequate on local residential streets.

		Min. Right of Way, Ft.
2.	Urban	
a.	Major Thoroughfare Other than Freeway and Expressway	90
b.	Minor Thoroughfare	70
c.	Local Street	*60
d.	Cul-de-sac	**Variable

The subdivider will only be required to dedicate a maximum of 100 feet of right-of-way. In cases where over 100 feet of right-of-way is desired, the subdivider will be required only to reserve the amount in excess of 100 feet. On all cases in which right-of-way is sought for an access controlled facility, the subdivider will only be required to make a reservation.

A partial width right-of-way, not less than sixty (60) feet in width, may be dedicated when adjoining undeveloped property that is owned or controlled by the subdivider; provided that the width of a partial dedication be such as to permit the installation of such facilities as may be necessary to serve abutting lots. When the said adjoining property is subdivided, the remainder of the full required right-of-way shall be dedicated.

B. Street Widths: Widths for street and road classifications other than local shall be as required by the Thoroughfare Plan. Width of local roads and streets shall be as follows:

1. Local Residential
   Curb and gutter section 26 feet, to face of curb
   Shoulder section - 20 feet to edge of pavement, 4 foot shoulders

---

*The desirable minimum right-of-way is established as 60 feet. If curb and gutter is provided, 50 feet of right-of-way is adequate.

**The right-of-way dimension will depend on radius used for vehicular turnaround. Distance from edge of pavement of turnaround to right-of-way should not be less than distance from edge of pavement to right-of-way on street approaching turnaround.

2. Residential Collector
   Curb and gutter section 34 feet, face to face of curb
   Shoulder Section 20 feet to edge of pavement, 6 foot shoulders

C. Geometric Characteristics: The standards outlined below shall apply to all subdivision streets proposed for addition to the State Highway System or Municipal Street System. In cases where a subdivision is sought adjacent to a proposed thoroughfare corridor, the requirements of dedication and reservation discussed under Right-of-Way shall apply.

1. Design Speed

The design speeds for subdivision type streets shall be:

	Desirable	(Minimum)		
		Level	Rolling	Mountainous
Rural				
Minor Collector Roads	60	(50)	(40)	(30)
Local Roads including Residential Collectors and Local Residential	50	(50)*	(40)*	(30)*
Urban				
Major Thoroughfares Other than Freeway or Expressway	60	(50)	(50)	(50)
Minor Thoroughfares	60	(50)	(40)	(40)
Local Streets	40	(40)**	(30)**	(20)**

*Based on projected annual average daily traffic of 400-750. In cases where road will serve a very limited area and small number of dwelling units, minimum design speeds can be reduced further.

**Based on projected annual average daily traffic of 50-250.

2. Maximum and Minimum Grades

a. The maximum grades in percent shall be:

Design Speed	Level	Rolling	Mountainous
60	3	4	6
50	4	5	7
40	5	6	8
30		9	10
20			12

b. A minimum grade for curbed streets normally should not be less than 0.5%, a grade of 0.35% may be allowed where there is a high type pavement accurately crowned and in areas where special drainage conditions may control.

c. Grades for 100 feet each way from intersections should not exceed 5%.

d. For streets and roads with projected annual average daily traffic less than 250, short grades less than 500 feet long, may be 150% greater.

3. Minimum Sight Distances

In the interest of public safety, no less than the minimum sight distance applicable shall be provided in every instance. Vertical curves that connect each change in grade shall be provided and calculated using the following parameters. (General practice calls for vertical curves to be multiples of 50 feet. Calculated lengths shall be rounded up in each case):

Design Speed, MPH	20	30	40	50	60
Stopping Sight Distance					
Min. Distance, Ft.	150	200	275	350	475
Des. Distance, Ft.	150	200	300	450	650
Min. K* Value For:					
Min. Crest Curve	16	28	55	85	160
Des. Crest Curve	16	28	65	145	300
Min. SAG Curve	24	35	55	75	105
Des. SAG Curve	24	35	60	100	155
Passing Sight Distance					
Min. Passing Distance, Feet (2 lane)		1100	1500	1800	2100
Min. K* Value For Crest Vertical Curve		365	686	985	1340

Sight distance provided for stopped vehicles at intersections should be in accordance with, "A Policy on Geometric Design of Highways and Streets, 1984".

4. The following table shows the maximum degree of curve and related maximum superelevation for design speeds. The maximum rate of roadway superelevation (e) for rural roads with no curb and gutter is .08. The maximum rate of superelevation for urban streets with curb and gutter is .06 with .04 being desirable.

---

*K is a coefficient by which the algebraic difference in grade may be multiplied to determine the length in feet of the vertical curve which will provide minimum sight distance.

Design Speed MPH	Maximum e*	Minimum Radius (Rounded) Feet	Maximum Degree of Curve (Rounded) Degrees
20	.04	125	45.0
30	.04	300	19.0
40	.04	560	10.0
50	.04	925	6.0
60	.04	1410	4.0
20	.06	115	50.0
30	.06	275	21.0
40	.06	510	11.5
50	.06	830	7.0
60	.06	1260	4.5
20	.08	110	53.5
30	.08	250	23.0
40	.08	460	12.5
50	.08	760	7.5
60	.08	1140	5.0

*e = rate of roadway superelevation, foot per foot

D. Intersections

1. Streets shall be laid out so as to intersect as nearly as possible at right angles, and no street should intersect any other street at an angle less than sixty (60) degrees.

2. Property lines at intersections should be set so that the distance from the edge of pavement, of the street turnout, to the property line will be at least as great as the distance from the edge of pavement to the property line along the intersecting streets. This property line can be established as a radius or as a sight triangle. Greater offsets from the edge of pavement to the property lines will be required, if necessary, to provide sight distance for the stopped vehicle on the side street.

3. Off-set intersections are to be avoided unless exception is granted by the Division of Highways for intersections involving the State Highway System, or the Planning Board for intersections involving only the municipal street system. Intersections which cannot be aligned should be separated by a minimum length of 200 feet between survey centerlines.

E. Cul-de-sacs

Cul-de-sacs, unless exception is granted by the local planning board, shall not be more than five hundred (500) feet in length. The distance from the edge of pavement on the vehicular turnaround to the right-of-way line should not be less than the distance from the edge of pavement to right-of-way line on the street approaching the turnaround. Cul-de-sacs should not be used to avoid connection with an existing street or to avoid the extension of an important street.

F. Alleys

1. Alleys shall be required to serve lots used for commercial and industrial purposes except that this requirement may be waived where other definite and assured provision is made for service access.

   Alleys shall not be provided in residential subdivisions unless necessitated by unusual circumstances.

2. The width of an alley shall be at least twenty (20) feet.

3. Deadend alleys shall be avoided where possible, but if unavoidable, shall be provided with adequate turnaround facilities at the deadend as may be approved by the Planning Board.

4. Sharp changes in alignment and grade shall be avoided.

G. Permits For Connection To State Roads

An approved permit is required for connection to any existing state system road. This permit is required prior to any construction on the street or road. The application is available at the office of the nearest District Engineer of the Division of Highways.

H. Offsets To Utility Poles

Poles for overhead utilities should be located clear of roadway shoulders, preferably a minimum of at least 30 feet from the edge of pavement. On streets with curb and gutter, utility poles shall be set back a minimum distance of 6 feet from the face of curb.

I. Wheel Chair Ramps

In accordance with Chapter 136, Article 2A, §136-44.14, all street curbs in North Carolina being constructed or reconstructed for maintenance purposes, traffic operations, repairs, correction of utilities, or altered for any reason after September 1, 1973, shall provide wheelchair ramps for the physically handicapped at all intersections where both curb and gutter and sidewalks are provided and at other major points of pedestrian flow.

Wheelchair ramps and depressed curbs shall be constructed in accordance with details contained in the Department of Transportation, Division of Highways, Publication entitled, "Guidelines, Curb Cuts and Ramps for Handicapped Persons".

J. Horizontal Width on Bridge Deck

1. The clear roadway widths for new and reconstructed bridges serving 2 lane, 2 way traffic should be as follows:

   a. Shoulder Section Approach

      i. Under 800 ADT Design Year

         Minimum 28 feet width face to face of parapets of rails or pavement width plus 10 feet, whichever is greater.

      ii. 800-2000 ADT Design Year

         Minimum 34 feet width face to face of parapets or rails or pavement width plus 12 feet, whichever is greater.

      iii. Over 2000 ADT Design Year

         Minimum 40 feet
         Desirable 44 feet width face to face of parapets or rails.

   b. Curbs and Gutter Approach

      i. Under 800 ADT Design Year

         Minimum 24 feet face to face of curbs.

      ii. Over 800 ADT Design Year

         Width of approach pavement measured face to face of curbs.

Where curb and gutter sections are used on roadway approaches, curbs on bridges shall match the curbs on approaches in height, in width of face to face of curbs, and in crown drop. The distance from face of curb to face of parapet or rail shall be 1'6" minimum, or greater if sidewalks are required.

2. The clear roadway widths for new and reconstructed bridges having 4 or more lanes serving undivided two-way traffic should be as follows:

   a. Shoulder Section Approach - Width of approach pavement plus width of usable shoulders on the approach left and' right.
      Min. 8'
      Des. 10

   b. Curb and Gutter Approach - Width of approach pavement measured face to face of curbs.

GRD/wp